What is API?

- API stands for Application Programming Interface
- It acts as a two-way communication bridge between frontend and backend

Types of APIs:

There are many types of APIs used in software development.
Here are the most important and commonly used API types:

1. REST API (Representational State Transfer): The most popular API style.

Uses:

- HTTP methods (`GET`, `POST`, `PUT`, `DELETE`)
- JSON data

Features

- Stateless
- Simple
- Fast
- Widely used

2. SOAP API (Simple Object Access Protocol): An older and stricter API protocol.

Uses:

- XML only
- Strong security standards

Features

- Very secure
- Complex
- Strong validation
- Enterprise-level reliability
- Used in:
  - banking
  - enterprise systems
  - government systems

3. GraphQL API: A modern API query language Created by Meta Platforms (Facebook). Allows clients to request exactly the data they need.

Example

```
{
  user(id:1){
     name
     email
  }
}
```

Features

- Flexible queries
- Reduces extra data
- Single endpoint

Used In

- Modern frontend applications
- Dashboards
- Complex applications

4. gRPC API: A high-performance API framework Created by Google.

Uses:

- Protocol Buffers (protobuf)
- HTTP/2

Features

- Extremely fast
- High performance
- Common in microservices

Used In

- Microservices
- Distributed systems
- Real-time backend communication

5. WebSocket API: Used for real-time two-way communication.

How It Works:

Keeps a permanent connection open between:

- client
- server

Used in:

- chat apps
- live games
- stock markets
- live notifications

Features

- Two-way communication
- Real-time updates

6. RPC API (Remote Procedure Call): Allows one system to call functions on another server.

Types

- XML-RPC
- JSON-RPC

Example

Client calls remote methods/functions directly.

```
{
   "method": "getUser"
}
```

Main Features

- Function-based communication
- Simple internal service communication

Used In

- Backend services
- Internal APIs
- Distributed applications

7. OpenAPI API: A standard for documenting REST APIs.

Previously called:

Swagger

Purpose:

Describes APIs clearly.

Used for:

- documentation
- testing
- auto-generated clients

Used In

- Backend development
- API testing tools
- Team collaboration

8. Webhook API: An event-based API.

How It Works:

Instead of asking repeatedly:

- server automatically sends data when an event happens.

Example

Payment success notification.

Features

- Real-time event delivery
- Push-based communication

9. Library API: APIs inside programming libraries/frameworks.

Example

```
math.sqrt(25)
```

Here:

- `sqrt()` is an API method.

Summary of APIs

An API (Application Programming Interface) is a communication bridge that allows the frontend and backend, or different systems, to communicate with each other.

API Type	Summary
REST API	The most common API type. Uses HTTP methods and JSON. Simple, fast, and widely used for web and mobile apps.
SOAP API	A secure and strict XML-based API used in banking, enterprise, and government systems.
GraphQL API	A flexible API that lets clients request only the data they need. Common in modern frontend applications.
gRPC API	A very fast and high-performance API framework used in microservices and distributed systems.
WebSocket API	Provides real-time two-way communication between client and server. Used in chat apps and live systems.
RPC API	Allows systems to call functions remotely on another server. Used for backend and internal communication.
OpenAPI API	A standard for documenting and testing REST APIs. Previously known as Swagger.
Webhook API	An event-driven API where the server automatically sends updates when an event occurs.
Library API	APIs provided inside programming libraries and frameworks, such as Python functions like `math.sqrt()`.